

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: G. Finn Wredenhagen, Gary Cheng, Ming Tse

Confirmation No.: 8113

Serial No.: 09/929,282 Examiner: Brian Q. Le

Filed: August 15, 2001 Group Art Unit: 2621

For: SYSTEM AND METHOD FOR INTERPOLATING A TARGET
IMAGE FROM A SOURCE IMAGE

Date: May 4, 2006

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Responsive to the Office Action, dated February 9, 2006, please amend the application as follows.

Claims amendments begin on page 2.

Remarks begin on page 5.

CLAIMS

Amend the claims as follows.

- 1.-6. (Canceled)
7. (Previously presented) An interpolator, comprising:
a feature extractor to populate a feature table by identifying image features in a pixel array;
a feature comparator to populate a match table by matching features in the feature table.
8. (Previously presented) The interpolator of claim 7 where the image features are ramps, edges, segments, or noise.
9. (Previously presented) The interpolator of claim 7 where the feature extractor is adapted to be programmable.
10. (Currently amended) The interpolator of claim 7 where the image features are adapted to dynamically change according to user preferences.
11. (Previously presented) The interpolator of claim 7 where the feature extractor includes a state machine for each image feature.
12. (Previously presented) The interpolator of claim 7 where the feature comparator is adapted to match image features in adjacent rows of the pixel array.
13. (Previously presented) The interpolator of claim 7 where the feature comparator is adapted to match image features in adjacent columns of the pixel array.
14. (Previously presented) The interpolator of claim 7 comprising an alignment controller to align matched image features in the match table.
15. (Previously presented) The interpolator of claim 14 where the alignment controller is adapted to compute relative shifts between adjacent rows or columns.

16. (Previously presented) The interpolator of claim 14 where the alignment controller is adapted to identify a transition segment.
17. (Previously presented) The interpolator of claim 14 where the alignment controller is adapted to identify a pivot pixel.
18. (Previously presented) A method for interpolating a target pixel in an array of source pixels comprising:
populating a feature table by identifying image features in the source pixels;
populating a match table by matching features in the feature table; and
generating a target pixel responsive to the matching.
19. (Previously presented) The method of claim 18 where identifying image features includes identifying ramps, edges, segments, or noise.
20. (Previously presented) The method of claim 18 where identifying image features includes identifying programmable image features.
21. (Previously presented) The method of claim 18 where identifying image features includes identifying image features that are dynamically changing according to user preferences.
22. (Previously presented) The method of claim 18 where identifying image features includes using a state machine for each image feature.
23. (Previously presented) The method of claim 18 where matching features in the feature table includes matching features in adjacent rows of the pixel array.
24. (Previously presented) The interpolator of claim 18 where matching features in the feature table includes matching features in adjacent columns of the pixel array.
25. (Previously presented) The method of claim 18 comprising aligning matched image features in the match table.

26. (Previously presented) The method of claim 25 where aligning includes computing relative shifts between adjacent rows or columns.

27. (Previously presented) The method of claim 25 where aligning includes identifying a transition segment.

28. (Previously presented) The method of claim 25 where aligning includes identifying a pivot pixel.

29. (New) The interpolator of claim 1 where the feature table includes a pair-wise grouping of numbers defining a start position and intensity for each of the image features identified.

30. (New) The interpolator of claim 1 where the feature comparator is adapted to match like features in adjacent rows or columns of the feature table.

31. (New) The interpolator of claim 1 where the feature comparator is adapted to populate the match table at about the same time as the feature extractor populates the feature table.

32. (New) The method of claim 18 where populating the feature table includes populating the feature table with a pair wise grouping of numbers defining a start position and intensity for each image feature identified.

33. (New) The method of claim 32 where the populating the populating the match table includes matching like features in adjacent rows or columns of the feature table.

34. (New) The method of claim 32 where the populating the match table occurs at the same time as the populating the feature table.

REMARKS

Claims 7-28 are pending in the application prior to entering this amendment.

The examiner rejects claims 7-28 under 35 U.S.C. § 102(c) as being anticipated by Takahashi (U.S. Pat. No. 6,665,439).

The applicants amend claim 10 and add new claims 29-34.

Claims 1-34 remain in the case after entering this amendment.

The applicants add no new matter and request reconsideration.

Claim Rejections Under § 102

The examiner rejects claims 7-28 as old over Takahashi. The applicants disagree for the reasons that follow.

Claim 1 recites *a feature extractor to populate a feature table by identifying image features in a pixel array*. Claim 18 recites *populating a feature table by identifying image features in the source pixels*.

The examiner alleges Takahashi discloses the feature extractor with its extracting outlines of objects and edges. While Takahashi does disclose detecting edges “for extracting the outlines of objects appearing in a color image...by utilizing all of the color information of the pixels...,” it does not disclose a feature extractor that populates a feature table by identifying image as recited. The examiner alleges Takahashi discloses the feature table by populating or generating arrays of numeric values for edge templates. But in Takahashi, the edge templates are sets of arrays of numeric values corresponding to a specific one of the predetermined edge directions. The edge templates include *predetermined values* “such that when the color vectors of an array of pixels centered on the object pixel are subjected to array multiplication by an edge template, the edge vector corresponding to the direction of that edge template will be obtained as the vector sum of the result.” Takahashi, column 5, lines 36-41. Put differently, Takahashi discloses edge templates that are not populated *by identifying image features in a pixel array* as recited. Rather, the edge templates are predetermined or previously existing. New claim 29 and 32 adds the limitation that the feature table includes a pair-wise grouping of numbers defining a start position and intensity for each of the image features identified.

Claim 1 further recites *a feature comparator to populate a match table by matching features in the feature table*. Claim 18 recites *populating a match table by matching features in the feature table*.

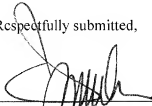
The examiner alleges Takahashi discloses the feature comparator with its "comparing edge in the modulus edge vector." In Takahashi, however, there is no match table populated by matching features in the feature table as recited. Takahashi discloses edge templates corresponding to a specific direction and with predetermined values such that when the color vectors of an array of pixels centered about the object pixel is subjected to array multiplication by an edge template, the edge vector corresponding to the direction of that edge template will be obtained as the vector sum of the result. Column 5, lines 34-41. The edge templates, therefore, not only do not include identified image features as we discuss above, the information contained within them is not subsequently used to *populate a match table by matching features in the feature table itself* as required by claims 1 and 18. New claims 30 and 33 crystallize the distinction by adding a limitation that the feature comparator is adapted to match like features in adjacent rows or columns of the feature table. New claims 31 and 24 add the limitation that the feature comparator is adapted to populate the match table at about the same time as the feature extractor populates the feature table (see specification page 13, lines 10-11).

Conclusion

For the foregoing reasons, the applicants request reconsideration and allowance of all remaining claims. The applicants encourage the examiner to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

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Respectfully submitted,



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